Claims

1.   (**Currently Amended**) In a computer system, a method of encoding audio data comprising:

encoding a first portion of an audio data sequence in a direct variable-dimension vector Huffman encoding mode that uses escape codes to indicate changes between plural Huffman code tables for different dimensions, wherein the encoding the first portion of the audio data sequence in the direct variable-dimension vector Huffman encoding mode comprises changing from a higher dimension vector Huffman code table of the plural Huffman code tables to a lower dimension vector Huffman code table of the plural Huffman code tables for encoding a vector of values from the first portion of the audio data sequence when the vector of values is not assigned a Huffman code in the higher dimension vector Huffman code table;

switching to a run-level encoding mode at a switch point; and

encoding a second portion of the audio data sequence in the run-level encoding mode.

2.   (Original) The method of claim 1 further comprising sending a flag in an encoded bitstream, wherein the flag indicates the switch point.

3.   (Original) The method of claim 1 wherein the first portion of the audio data sequence consists primarily of non-zero quantized audio coefficients, and wherein the second portion of the audio data sequence consists primarily of zero-value quantized audio coefficients.

4.   (Original) The method of claim 1 wherein the switch point is a pre-determined switch point.

5.   (Original) The method of claim 4 wherein the pre-determined switch point is determined experimentally by testing efficiency of encoding the audio data sequence using the pre-determined switch point.

6.   (Original) The method of claim 1 wherein the switch point is adaptively determined.

7.   (Original) The method of claim 1 further comprising:

switching to a third encoding mode at a second switch point.

8.   (Original) The method of claim 1 wherein the run-level encoding mode comprises context-based arithmetic encoding of run lengths and levels.

9.   (Original) The method of claim 1 wherein the run-level encoding mode comprises Huffman coding of run lengths and levels.

10.   (Original) The method of claim 1 wherein the run-level encoding mode comprises vector Huffman coding of run lengths and levels.

11.   (Original) A computer-readable medium storing computer-executable instructions for causing an audio encoder to perform the method of claim 1.

12-14. (Canceled)

15.   (**Currently Amended**) In a computer system, a method of decoding audio data comprising:

decoding a first portion of an encoded audio data sequence in a direct variable-dimension vector Huffman decoding mode that uses escape codes to indicate changes between plural Huffman code tables for different dimensions, wherein the decoding the first portion of the encoded audio data sequence in the direct variable-dimension vector Huffman decoding mode comprises changing from a higher dimension vector Huffman code table of the plural Huffman code tables to a lower dimension vector Huffman code table of the plural Huffman code tables when an escape code of the higher dimension vector Huffman code table is encountered in the encoded audio data sequence;

switching to a run-level decoding mode at a switch point; and

decoding a second portion of the encoded audio data sequence in the run-level decoding mode.

16.   (Original) The method of claim 15 further comprising:

prior to the switching, receiving a flag indicating the switch point.

17.   (Original) The method of claim 15 wherein the first portion of the encoded audio data sequence consists primarily of non-zero quantized audio coefficients, and wherein the second portion of the encoded audio data sequence consists primarily of zero-value quantized audio coefficients.

18.   (Original) The method of claim 15 wherein the switch point is a pre-determined switch point.

19.   (Original) The method of claim 15 wherein the switch point is adaptively determined.

20.   (Original) The method of claim 15 further comprising:

switching to a third decoding mode at a second switch point.

21.   (Original) The method of claim 15 wherein the run-level decoding mode comprises context-based arithmetic decoding of run lengths and levels.

22.   (Original) The method of claim 15 wherein the run-level decoding mode comprises Huffman decoding of run lengths and levels.

23.   (Original) The method of claim 15 wherein the run-level decoding mode comprises vector Huffman decoding of run lengths and levels.

24.   (Original) A computer-readable medium storing computer-executable instructions for causing an audio decoder to perform the method of claim 15.

25-77. (Canceled)

78.   (Previously Presented) The method of claim 1 wherein the encoding the first portion of the audio data sequence in the direct variable-dimension vector Huffman encoding mode comprises:

determining a Huffman code to use for encoding a vector of audio data symbols, wherein the determining is based on the audio data symbols and on a sum of values of the audio data symbols; and

encoding the vector of audio data symbols using the Huffman code.

79.   (Previously Presented) The method of claim 78 wherein the Huffman code is an escape code, wherein the vector of audio data symbols is an n-dimension vector, and wherein the escape code indicates that the n-dimension vector is to be encoded as x n/x-dimension vectors.

80.   **(Canceled)**

81.   (Previously Presented) The method of any claim 1 wherein the encoding the first portion of the audio data sequence in the direct variable-dimension vector Huffman encoding mode comprises:

determining that a first n-dimension vector of values from the first portion of the audio data sequence is assigned a Huffman code in an n-dimension vector Huffman code table of the plural Huffman code tables, wherein n is at least 2, and wherein the n-dimension vector Huffman code table contains Huffman codes for fewer than all possible n-dimension vectors of values;

encoding the first n-dimension vector using the assigned Huffman code from the n-dimension vector Huffman code table; and

responsive to determining that a second n-dimension vector of values from the first portion of the audio data sequence is not assigned a Huffman code in the n-dimension vector Huffman code table:

adding an escape code indicating a change to a n/2-dimension vector Huffman code table of the plural Huffman code tables;

dividing the second n-dimension vector into two n/2-dimension vectors;

determining that the two n/2-dimension vectors are assigned Huffman codes in the n/2-dimension vector Huffman code table, wherein the n/2-dimension vector Huffman code table contains Huffman codes for fewer than all possible n/2-dimension vectors of values; and

encoding the two n/2-dimension vectors using the assigned Huffman codes from the n/2-dimension vector Huffman code table.

82.   **(Canceled)**

83.   (Previously Presented) The method of claim 15 wherein the decoding the first portion of the encoded audio data sequence in the direct variable-dimension vector Huffman decoding mode comprises:

determining that a first Huffman code of the encoded audio data sequence is an escape code of an n-dimension vector Huffman code table of the plural Huffman code tables, wherein n is at least 2, and wherein the n-dimension vector Huffman code table contains Huffman codes for fewer than all possible n-dimension vectors of values;

responsive to determining that the first Huffman code of the encoded audio data sequence is the escape code of the n-dimension vector Huffman code table, decoding a second Huffman code of the encoded audio data sequence using an n/2-dimension vector Huffman code table of the plural Huffman code tables.